Space Weather Forecast

Issued on Friday, 23 February 2024 at 01:26 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: High solar activity. Current strongest flare of the solar cycle recorded with a chance of further strong flares.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been High over the past 24 hours, with a strong flare recorded at 22/0632UTC and most recently another Strong flare recorded at 22/2234 UTC, currently the strongest flare of the solar cycle, both from the large region in the northeast. This continues to be by far the largest and most complex of the currently three sunspot regions on the visible disc, with some significant complexity remaining in evidence despite some slight consolidation in recent hours. All other spot simple or small however signs on the southeastern limb suggest the imminent arrival of further active region.

A large filament (loop of plasma) was observed leaving the northwest of the disc around 21/1730UTC and may give a glancing blow late on 24 Feb or early on 25 Feb. Another CME appeared to originate in the area around the far southeast limb, but has been analysed as missing Earth. The first strong flare appears not to have produced a CME, while we await imagery for what looks likely to be a CME associated with the second strong flare.

Solar Wind / Geomagnetic Activity: Solar winds have been at ambient levels throughout. Total magnetic field strength has been weak, with the important north-south component initially varying weakly, but becoming weakly positive from 22/1700UTC. Geomagnetic activity was Quiet (Kp1-2).

Energetic Particles / Solar Radiation: Solar radiation was just above resting background levels but well below the Minor Radiation Storm threshold.

Four-Day Space Weather Forecast Summary

Solar Activity: Activity is forecast to remain Moderate to High, with occasional Moderate flares expected and a chance of further Strong class flares, particularly in the short term, from the region in the northeast. This risk allowed to decline somewhat towards more expected levels into the period pending further developments and classification of oncoming regions.

Solar Wind / Geomagnetic Activity: A large filament (loop of plasma) was observed leaving the northwest of the disc around 21/1730UTC and is modeled to perhaps give a glancing blow late on day 2 (24 Feb) or more likely early on day 3 (25 Feb). No other CMEs (Coronal Mass Ejections) currently feature in the forecast. Current solar winds are near background values but faster solar winds are expected to connect with Earth perhaps as early as day 2 (24 Feb) but more likely by day 3 (25 Feb), and persist through the remainder of the period. Peak speeds expected around 500km/s. Geomagnetic activity is forecast to remain Quiet initially. Unsettled to Active intervals are then considered likely on days 2 and 3 (24/25 Feb), with a chance of G1/Minor storm intervals, particularly if connection to the faster winds and the glancing blow

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from the filament CME occur at similar times.

Energetic Particles / Solar Radiation: Solar radiation levels are expected to continue at generally background levels or just above, but the large region in the northeast will become an increasing source of potential solar radiation as the region moves towards and beyond centre disc through the forecast period, with a slight but increasing chance of S1 Minor Radiation Storms.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	10	30	10
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	80	80	80	80
Very Active	R3 to R5 X	Yes	50	40	30	25

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	15	20	25
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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